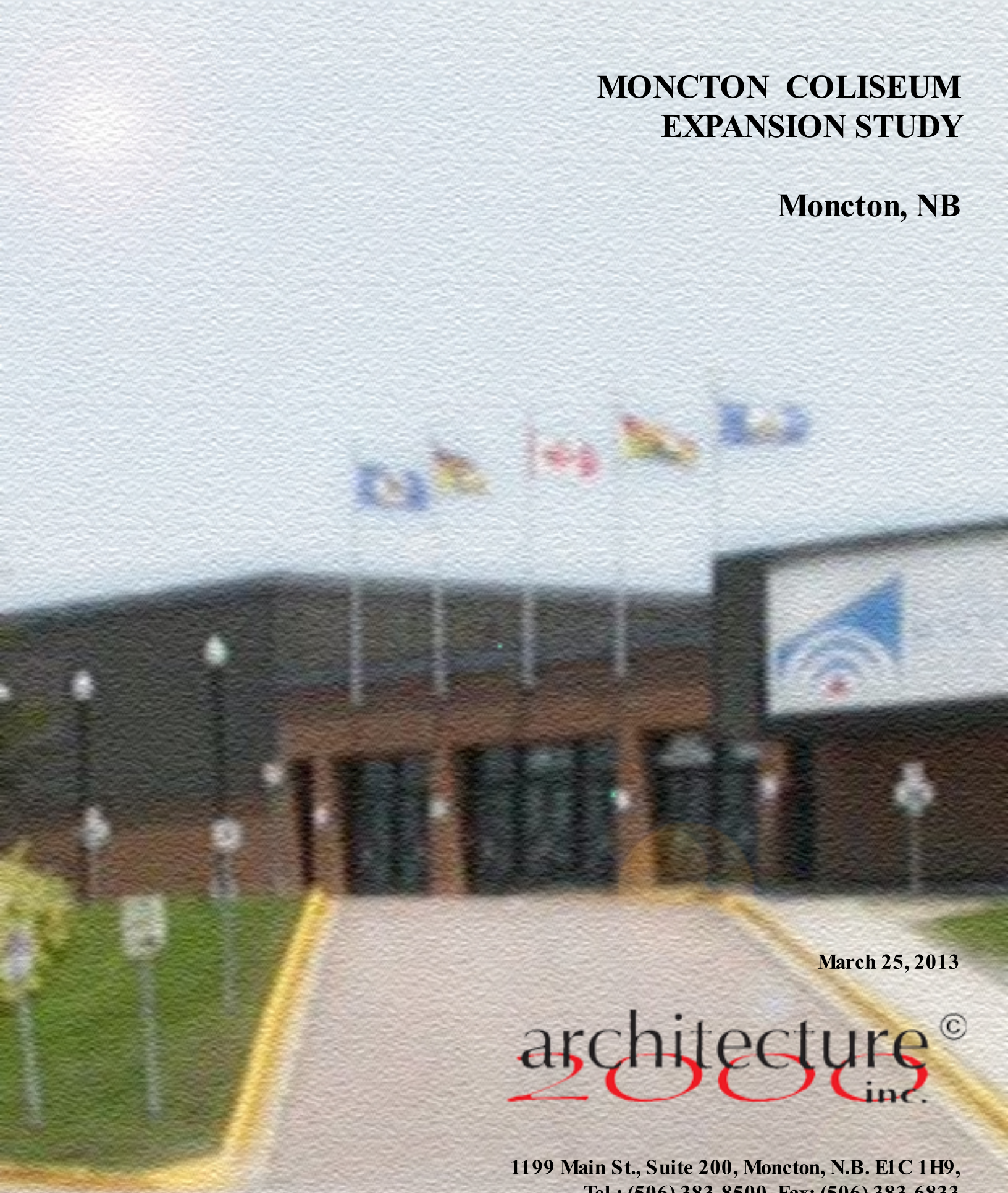
MONCTON COLISEUM EXPANSION STUDY

Moncton, NB



March 25, 2013

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AVERY READY INDEX 600092

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Appendix A – Individual budgets

1.0 INTRODUCTION

The intent of the enclosed expansion / renovation is to extend the existing facilities life span and augment facilities use and rental capacity.

Based on a new state of the art 9000 seat arena, we have proposed to both upgrade and replace existing systems / materials in order to meet a projected longevity of 50+ years.

As not to impact existing facility operations during the initial construction of concrete and steel, we have proposed the new structure be erected over the existing facility. This will maintain user rental at the existing building for 12 of the 20 months construction schedule. The remaining 8 months construction period will require shut down of the existing facility in order to complete demolition and renovation work.

During the demolition phase of construction all lower bowl seating must be removed for work to be completed overhead, and reinstall prior to building completion.

The existing Agrena will require fire separation barriers installed but should be able to maintain operations throughout construction period.

2.0 CONSULTANT REPORTS

2.1 ARCHITECTURAL

2.1.1 Description

2.1.1.1 Existing Conditions (Major Areas):

.1 The exterior building is currently comprised of metal cladding and brick. (The cladding finish is close to expected life cycle). The slope roof is a modified cap sheet over minimal insulation, the roof has exceeded the expected life cycle. Exterior aluminum and steel doors are close to expected life cycle.
.2 Main exterior stairs do not have required handrails and therefore do not meet code.
.3 The building interior does not meet code requirements for washrooms, exiting width requirements, barrier-free requirements in multiple locations, guard rails and handrails.
.4 Upper bowl seating will have to be replaced in order to meet the new projected life cycle.

2.1.2 Outline Specifications

EXTERIOR:

2.1.2.1 Wall System

.1 Existing concrete block or new 190 mm concrete block to CAN3-A165.
.2 1.0 mm SBS Modified Bitumen Membrane reinforced air / vapour barrier.
.3 R-16 mineral fibre insulation to ASTM C612.
.4 Face Brick and pre-finished aluminum composite panel (rain screen principal).

2.1.2.2 *Roof System*

.1 Steel deck.
.2 SBS Modified Bitumen self adhered vapour barrier c/w primer.
.3 R-30 semi rigid insulation c/w factory laminated top layer of 2.2 mm SBS Modified Membrane.
.4 4.0 mm cap sheet, reinforced, c/w granulated top surface.

2.1.2.3 Aluminum Entrance System

.1 Aluminum doors to be porthole construction with minimum wall thickness of 2.4 mm, constructed for heavy traffic.
.2 Hardware to be continuous hinge exit device with pull, aluminum threshold, weather-stripping, closure and barrier-free operator.
.3 Glazing to be thermo tempered units.
.4 All doors and frames to be finished in accordance with AA-M12C22A41.

2.1.2.4 Exterior Steel Stairs / Rails

.1 Galvanized steel stair, open riser and anti-slid open grate tread. Stair to be manufactured to ANSI / NAAMM MBG 531
.2 Galvanized 40 mm O.D. handrail, schedule 40, to ASTM A53/A53M.
.3 Galvanized bolts to ASTM A325M.

INTERIOR:

2.1.2.5 Millwork

.1 Finish millwork to have core of poplar plywood to CSA 0153, c/w 1.2 mm thick high pressure plastic laminate to CSA CAN3-A172.
.2 Countertops to be finished in 1.2 mm thick textured finish high pressure plastic laminate or 3 mm No. 304 stainless steel.

2.1.2.6 Washroom Partitions

.1 25 mm laminated plastic toilet partitions, 20 kg density, reinforced with 3 mm plate steel, and 1.2 mm plastic laminate. Overhead braced No. 304 stainless steel shoe, and heavy duty stainless steel hardware.

2.1.2.7 Painting

.1 All painting to meet MPI Architectural Painting Specifications manual.

2.1.2.8 Fixed Partitions

.1 All interior fixed partitions to be 190 mm concrete block painted.

2.1.2.9 Interior Doors, Frames, and Hardware

.1 1.6 mm pressed steel frame, welded type construction fabricated to CSDMA Specifications.
.2 1.6 mm steel door c/w honeycomb cove and lock seams fabricated to CSDMA Specifications.
.3 Door hardware to meet ANSI / BHMA A156 Series.
.4 All hardware to be keyed into City of Moncton system.

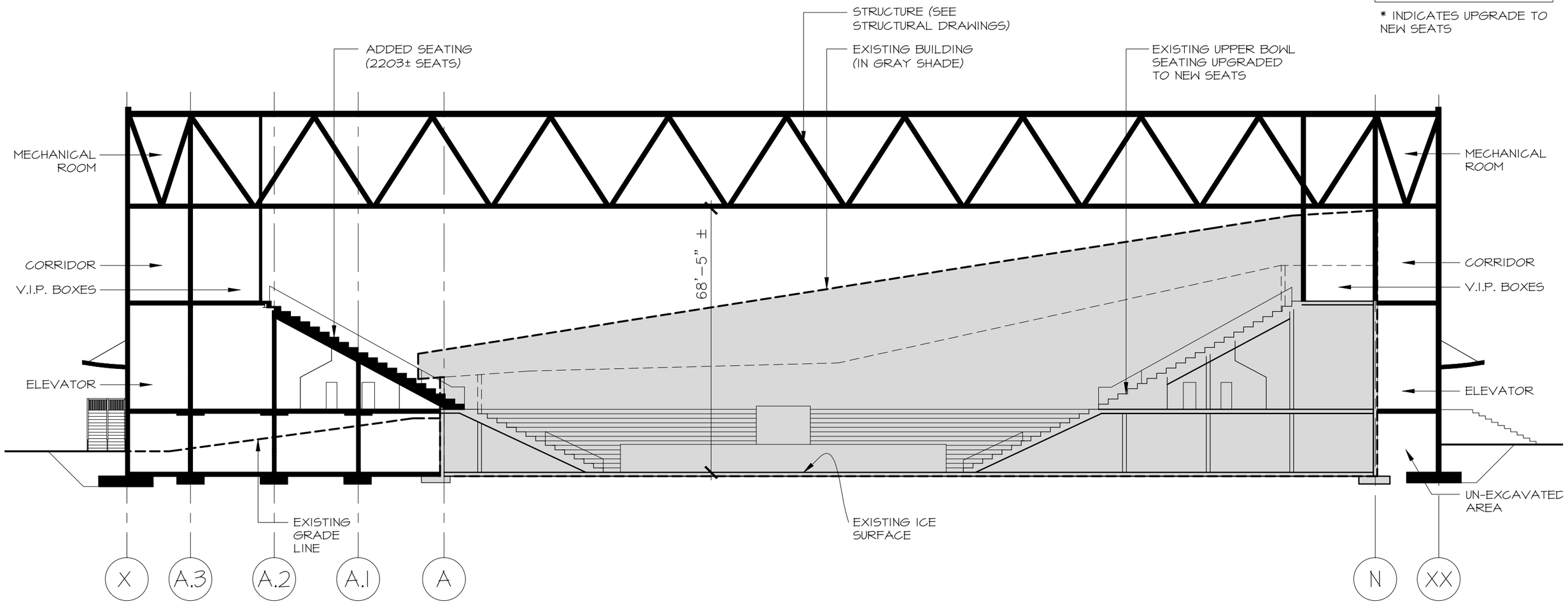
2.1.2.10 Seating

.1 Plastic manual fold seat (200 mm rise x 400 mm wide) with arm rest, seat numbers, self rising, back mounted.

2.1.3 DRAWINGS (Architectural)

SEATING CHART	
EXISTING SEATING:	
LOWER BOWL	4345
UPPER BOWL	* 2069±
BARRIER FREE	25
ADDED SEATING:	
UPPER BOWL	2203±
V.I.P BOXES	384
TOTAL:	9026 SEATS

* INDICATES UPGRADE TO NEW SEATS



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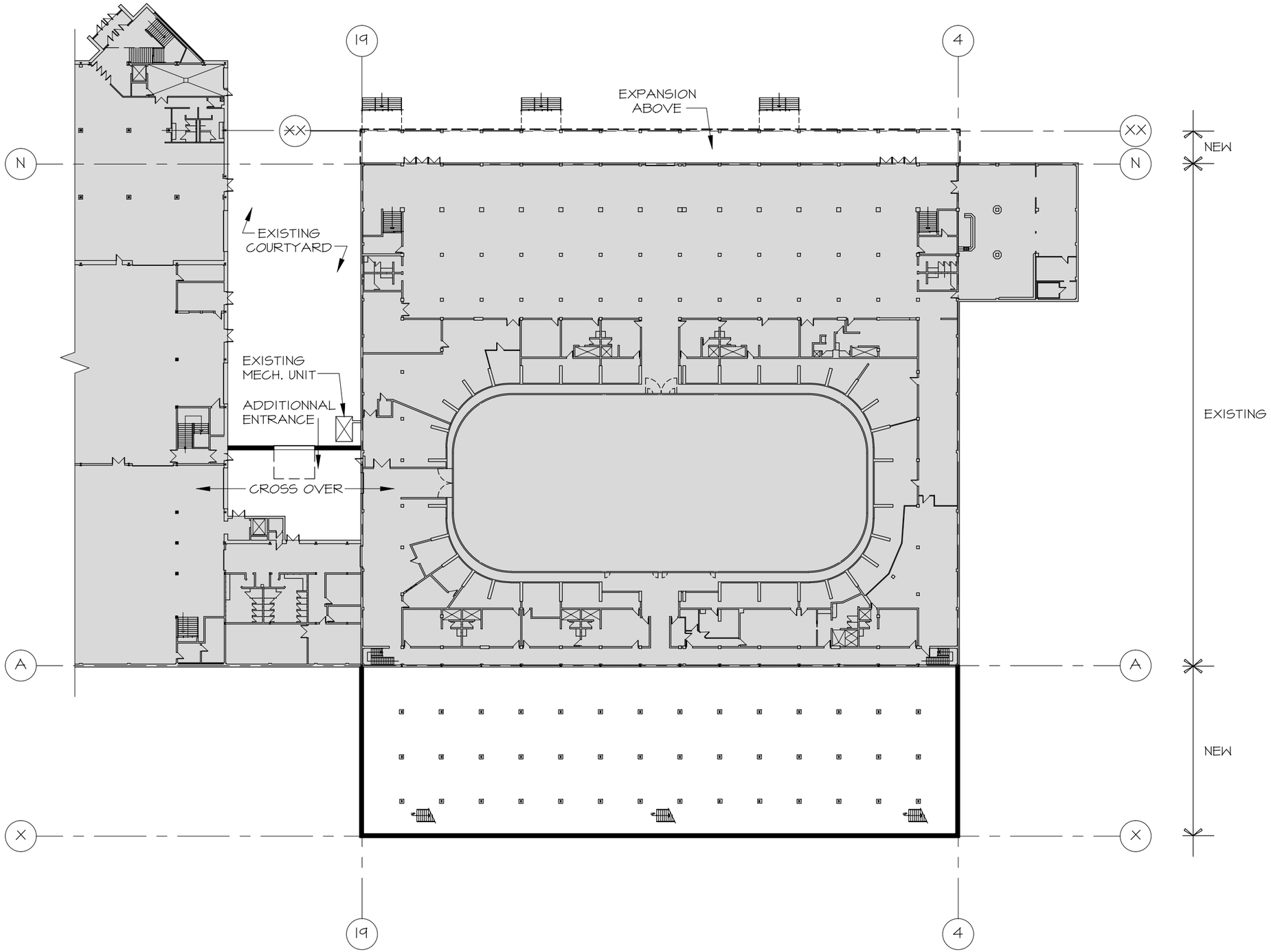
MONCTON COLISEUM EXPANSION STUDY

schematic cross section - option a

moncton, nb

2013|03|25

nts



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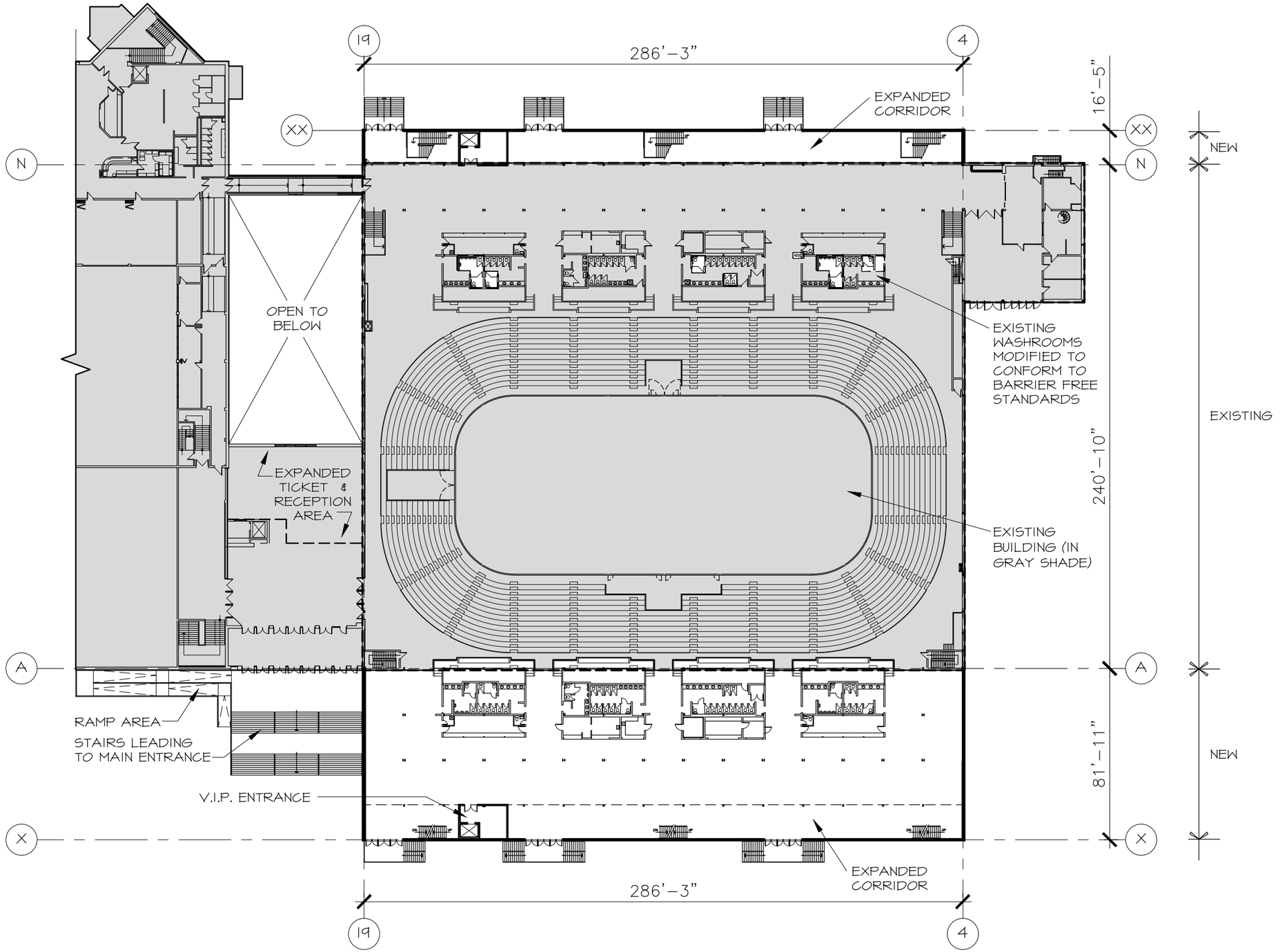
MONCTON COLISEUM EXPANSION STUDY

schematic floor plan - level 1 - option a

moncton, nb

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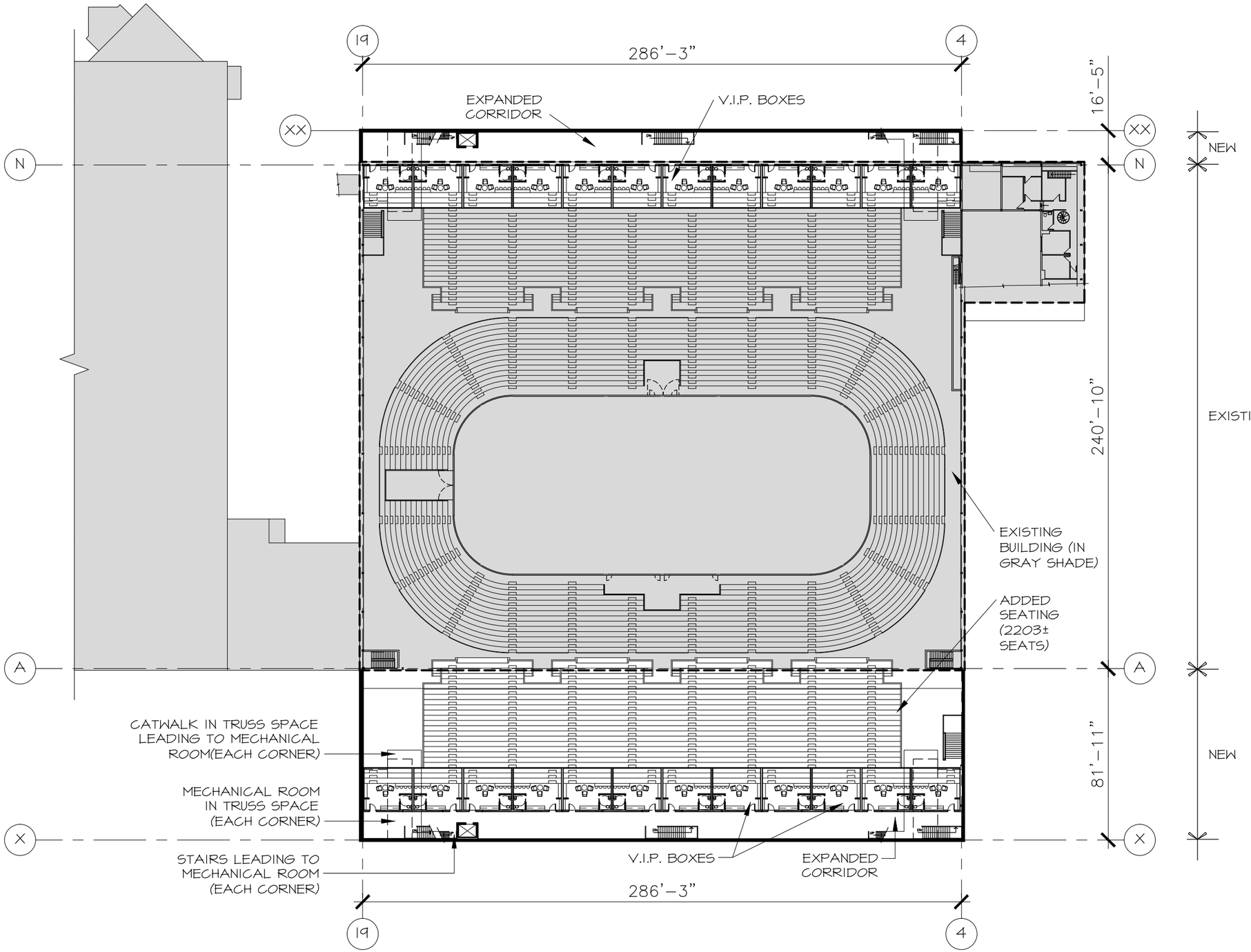
MONCTON COLISEUM EXPANSION STUDY

schematic floor plan - level 2 - option a

moncton, nb

2013|03|25

nts



SEATING CHART	
EXISTING SEATING:	
LOWER BOWL	4345
UPPER BOWL	* 2069±
BARRIER FREE	25
ADDED SEATING:	
UPPER BOWL	2203±
V.I.P BOXES	384
TOTAL:	9026 SEATS

* INDICATES UPGRADE TO NEW SEATS

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MONCTON COLISEUM EXPANSION STUDY

schematic floor plan - level 3 - option a

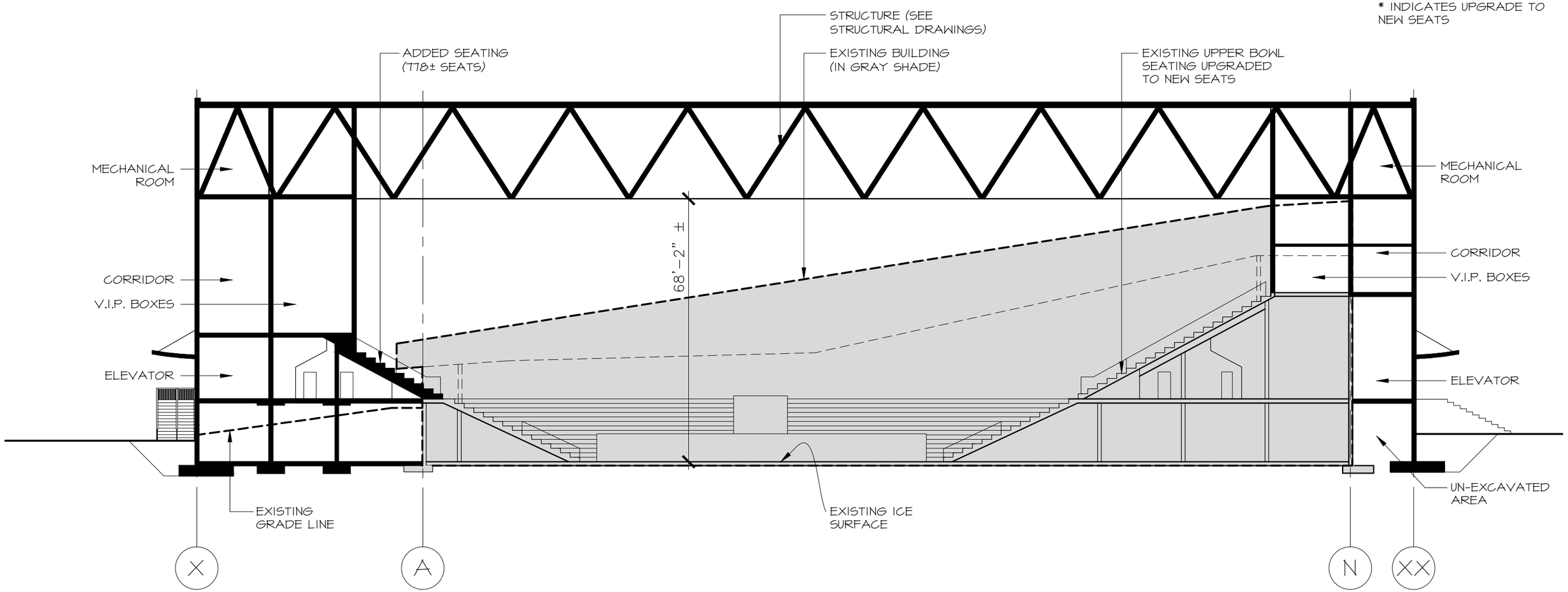
moncton, nb

2013|03|25

nts

SEATING CHART		
EXISTING SEATING:		
LOWER BOWL		4345
UPPER BOWL	*	2069±
BARRIER FREE		25
ADDED SEATING:		
UPPER BOWL		778±
V.I.P BOXES		384
TOTAL:		7601 SEATS

* INDICATES UPGRADE TO NEW SEATS



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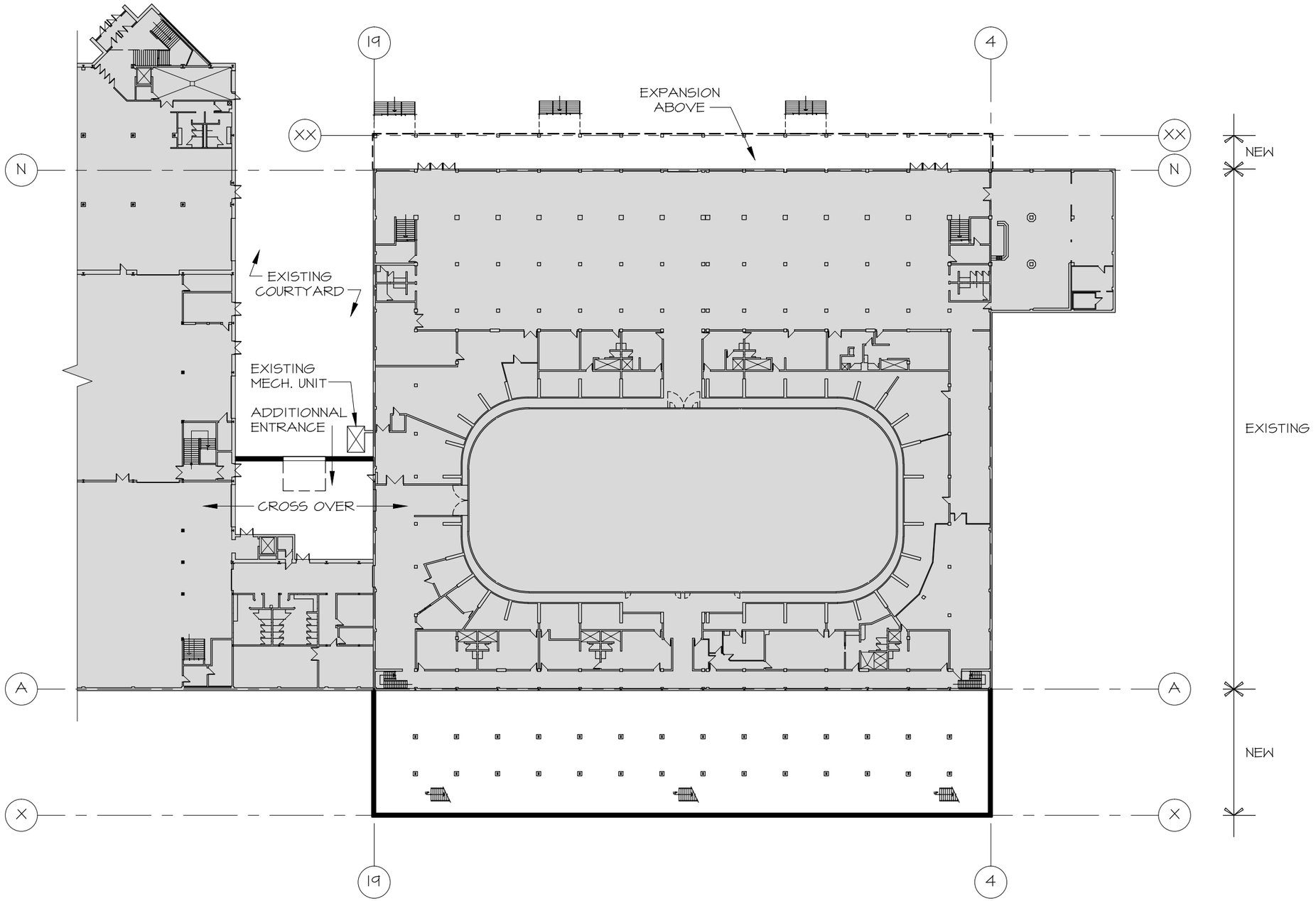
MONCTON COLISEUM EXPANSION STUDY

schematic cross section - option b

moncton, nb

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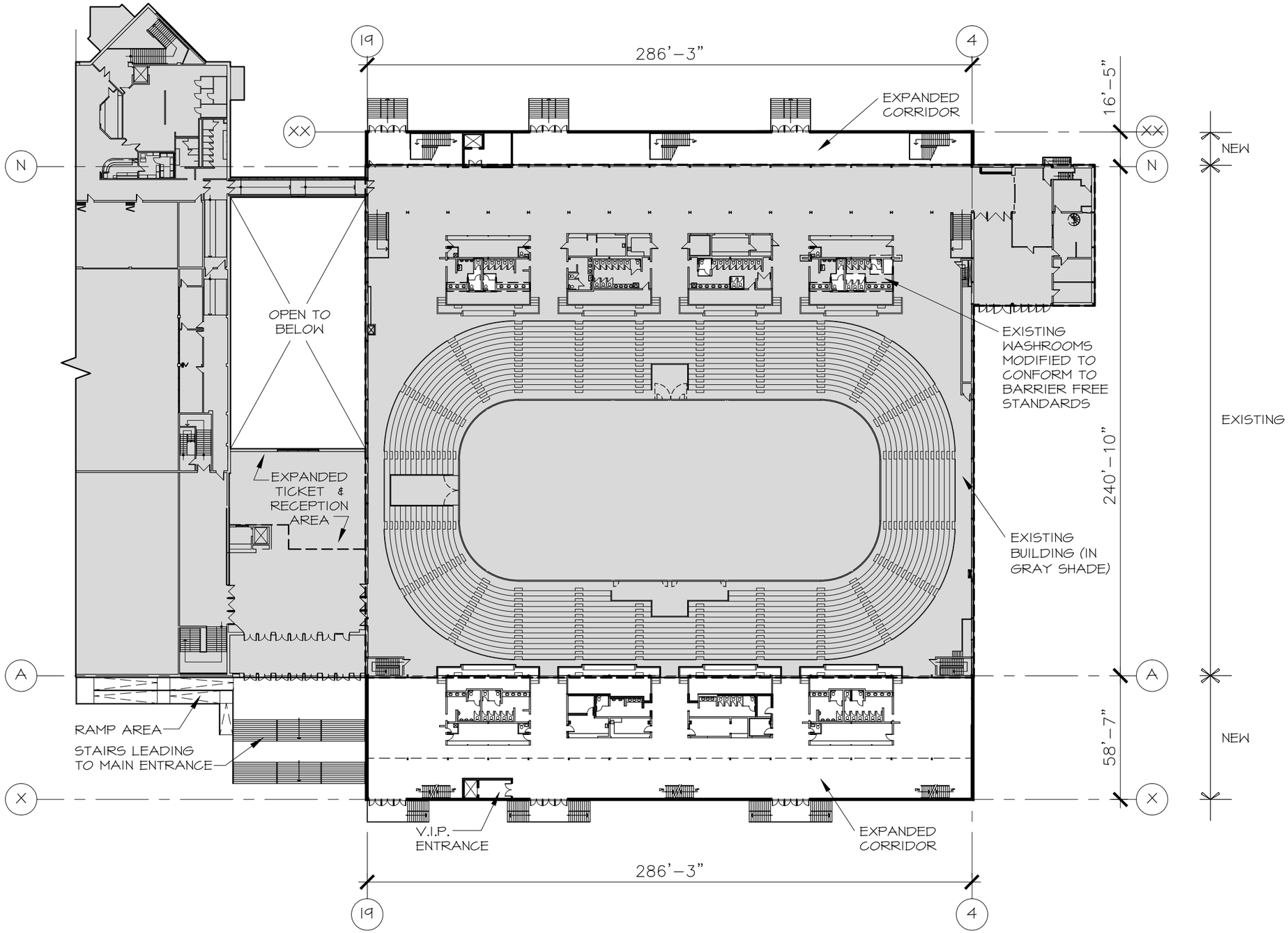
MONCTON COLISEUM EXPANSION STUDY

schematic floor plan - level 1 - option b

moncton, nb

2013|03|25

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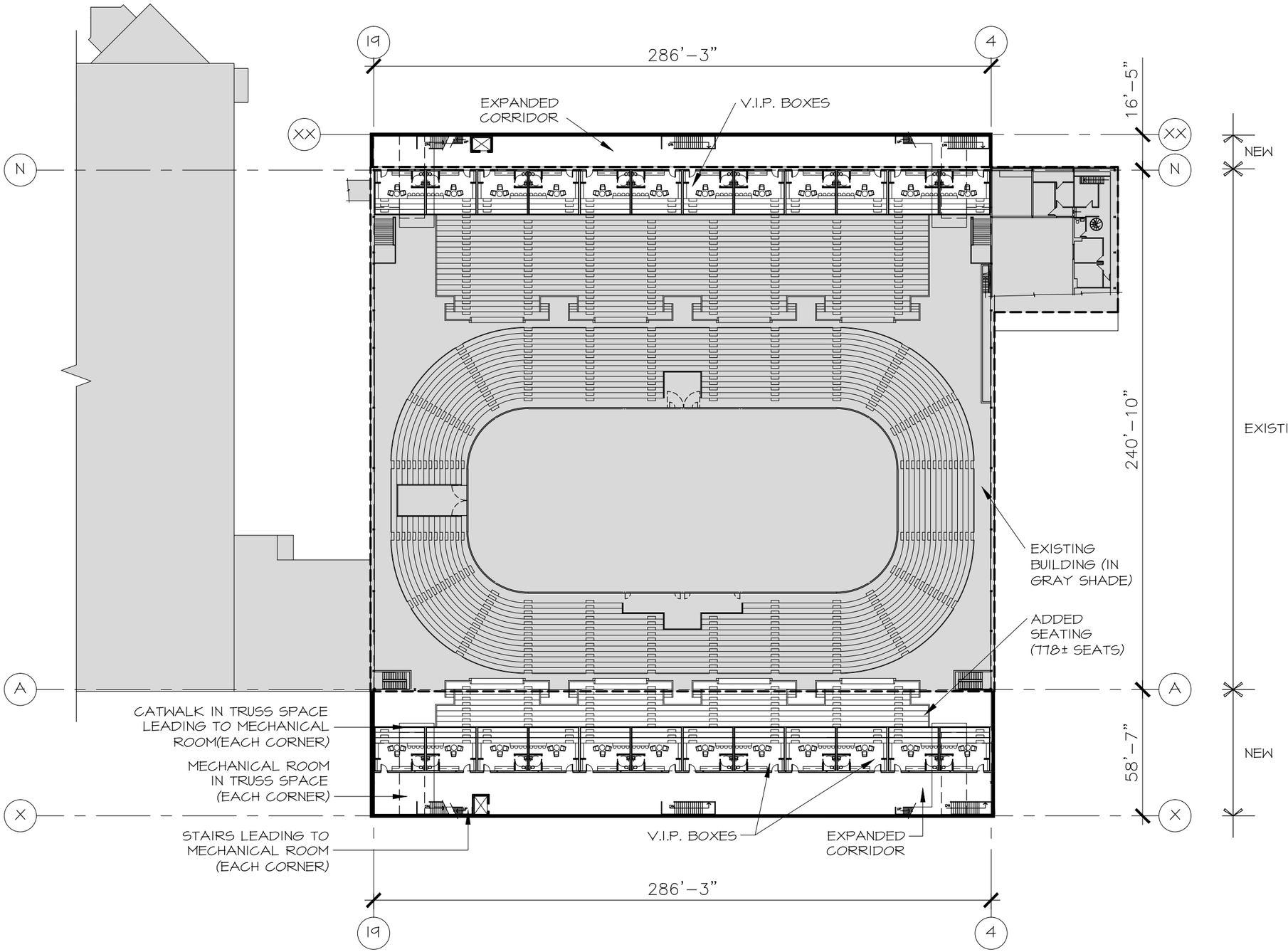
MONCTON COLISEUM EXPANSION STUDY

schematic floor plan - level 2 - option b

moncton, nb

2013|03|25

nts



SEATING CHART	
EXISTING SEATING:	
LOWER BOWL	4345
UPPER BOWL	* 2069±
BARRIER FREE	25
ADDED SEATING:	
UPPER BOWL	778±
V.I.P BOXES	384
TOTAL:	7601 SEATS

* INDICATES UPGRADE TO NEW SEATS

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MONCTON COLISEUM EXPANSION STUDY

schematic floor plan - level 3 - option b

moncton, nb

2013|03|25

nts

2.2 STRUCTURAL

2.2.1 Description

The new building expansion construction is to consist of a steel frame with steel purlins supporting insulated panels on reinforced concrete spread footings. Level one floor is to be slab-on-grade; level 2 floor is to be a two way structural slab, level 3 floor to consist of composite concrete/steel deck, and the roof to consist of steel trusses supporting open web steel joists overlain with steel deck.

The new expansion will involve demolishing the existing 29 ft high roof and replacing it with a new 60 ft high roof. It is proposed that the new roof system be constructed over top of the existing roof, in sequence with the demolition of the existing roof, to minimize exposure of the existing building interior.

2.2.1.1 Foundations

Foundations for the new structure are located far enough away to minimize impacting the existing building foundations. Grid spacing of the new footings / columns will match the grid of the existing structure.

2.2.1.2 Level 1

Level 1 exhibition space on the west side addition will be expanded. New door openings will be saw-cut through the existing concrete walls to link the new space with the existing. Level 1 on the east side will be unexcavated to prevent requirement of new saw-cut openings since the area is minimal. The existing man-doors and loading doors at the existing exterior wall will remain, and therefore the new foundation will provide tunnel ways for access.

2.2.1.3 Level 2

Level two floor will be extended with a two way structural concrete slab similar to the existing on the east and west sides.

2.2.1.4 Level 3

Steel beam structure will support a composite steel deck / concrete floor. Modification to the structure at the existing platforms on either side of the center press room on the east side will be required to support a new floor system for the VIP boxes.

2.2.1.5 Roof

Steel trusses will clear span the full length of the widened building and provide a clearance of approximately 60 ft. Open web steel joists spanning between the trusses will support the steel roof deck. Trusses will slope for drainage. Truss design will accommodate loads for new catwalks, lighting, score-clock and mechanical.

2.2.1.6 Bleachers

A new steel beam / column system will support the new pre-cast bleacher support structure for seating on the west side similar in concept to the existing system on the east side.

2.2.1.7 Expanded Ticket / Reception Area

The two level addition will consist of a slab-on-grade at level one floor, one way reinforced concrete slab at level two floor, and a steel roof system.

2.2.2 Outline Specifications

Building construction is to consist of a steel frame with steel purlins supporting insulated panels on reinforced concrete spread footings. Level one floor is to be a slab-on-grade; level 2 is to be a two way structural slab, level 3 to consist of composite concrete/steel deck, and the roof to consist of open web steel joists overlain with steel deck.

2.2.2.1 Building Design Criteria

Building design will be in compliance with the National Building Code of Canada (NBCC) and Canadian Standard Association (CSA). Building design criteria is based on achieving a life expectancy of 50 years plus.

2.2.2.2 Concrete

Fabricate and erect formwork in accordance with CAN/CSA-S269.3. Reinforcing steel to be billet steel grade 400 deformed bars to CAN/CSA-G30.18 and fabricated and placed in accordance with CAN/CSA A23.1.

Concrete to be normal density in accordance with CAN/CSA A23.1. Concrete for walls, footings, pedestals and interior slabs-on-grade to have minimum compressive strength of 25 Mpa with an F-2 class of exposure. Concrete for structural slabs and exterior walkways to have minimum compressive strength of 35 Mpa with an C-1 class of exposure. Concrete work is to be in accordance with CAN/CSA-A23.1.

Pre-cast concrete to be fabricated to CSA-A23.4. Erect to the tolerances as specified in CSA A23.4.

2.2.2.3 Structural Steel

Structural Steel, Steel Joists and Metal Fabrications to conform to CAN/CSA-G40.21. All structural steel to be Grade 350W with the exception of plates and angles which will be to Grade 300W. Hollow structural sections to be Class C 350 W. Anchor bolts to be 300W. Bolts, nuts and washers to ASTM A325M. Welding materials to conform to CSA W59. Steel to be fabricated and constructed in accordance with CAN/CSA-S16.1 and in accordance with reviewed shop drawings.
Steel deck to be designed, detailed and fabricated in accordance with CAN/CSA-S136 and CSSBI 10M and CSSBI 12M.

2.2.3 DRAWINGS (Structural)

2.3 MECHANICAL

2.3.1 Description

MCW Maricor has prepared this report, which summarizes the existing condition of mechanical and electrical systems, identifies issues and concerns and provides opinions of probable costs for upgrading these systems to meet the criteria proposed by the City of Moncton and to meet modern codes and standards with 3 options of seating capacity for upgrading of the existing coliseum building.

2.3.1.1 Plumbing systems

Domestic Hot Water (DHW) is generated and stored in one centralized location for the existing building. The DHW is heated via a combination of some heat recovery from the ammonia plant and electric elements. The DHW is distributed throughout the building within an insulated piping system and has a domestic hot water recirculation loop.

Public washrooms and dressing rooms utilize a mixture of flush valve water closets and flush valve urinals while the female and referee dressing rooms have flush tank water closets. The flush valve mechanisms for all water closets and urinals are exposed.

2.3.1.2 Fire Protection System

The existing building is equipped with an automatic fire sprinkler fire protection system. The system is original to the building. Existing piping and protection of the unaffected areas of the building is adequate for future service, however, the majority of the system is installed within the high level steel structure. It will be necessary to remove the existing piping and sprinkler heads installed in this space to permit removal of the existing structure.

A new automatic fire sprinkler suppression system will be required for the main area of the building within the new structure and to all renovated areas of the building.

Re- use of existing materials removed from the system is not permitted.

2.3.1.3 Refrigeration System

The ice plant consists of three reciprocating ammonia compressors each rated at 100 HP and providing 225 Tons to chill the brine loop.

Excess heat from the ammonia plant is rejected via one air cooled evaporative condenser located immediately outside.

An ice floor replacement was completed in year 2005.

2.3.1.4 HVAC System

The entire building is heated by electricity. Heating is provided by electric boiler providing hot water to unit heaters located in all areas of the building. There is no existing capacity for heat recovery from the existing ammonia plant to provide heat energy to the building.

The ventilation systems for the building are comprised of a minimum amount of exhaust fans and operable make–up intake dampers.

The existing building has no capacity for interior environmental controls. An existing system for controlling fresh air to building occupants is not compliant with existing building codes. Humidity control of the interior environment is also not available for this building. Cooling is not provided to any areas of the existing building.

2.3.1.5 Control Systems

The existing building is equipped with a Delta brand DDC controls system. The control system for the building provides all the control routines and scheduling for the major systems such as electric heaters, exhaust systems, ice plant and lighting. The DDC control permits set points and timing sequences for all HVAC and ice plant equipment in order to optimize the energy savings with the current systems.

Ice Plant:

Ice Surface has an occupied and unoccupied setpoint. If the ice plant schedule is 'on' then the ice setpoint equals occupied setpoint and if the schedule is 'off' then the setpoint equals unoccupied setpoint. All set points are adjustable from graphics screen.

Room Control:

Each space has an occupied and an unoccupied setpoint. The room setpoint will equal occupied setpoint if the occupied schedule is 'on'. If the schedule is 'not on', room setpoint will equal unoccupied set point. The space heater will turn on if the room temperature is 0.5 deg c below setpoint and shut down if the room temperature equals setpoint. If the outside air temperature is above space heating enable setpoint (18 deg c adjustable), then the heat will not enable. If the yearly calendar is on months May, June, July, August, or September, the heat will not enable.

2.3.2 Requirements for Upgraded Mechanical Systems

The following sections provide a summary of the mechanical system requirements for the renovated facility.

2.3.2.1 Plumbing

Mechanical systems requirements for the newly renovated building will consist of upgrades to the existing plumbing fixtures to meet current codes and standards for fixture quantities and water efficiency.

An expanded domestic hot water system will be required to meet demand of additional hot water supplied fixtures.

Storm water collection from the new roof structure will be required complete with piping and connection to the existing storm water system at the building. The detailed design process will need to evaluate any need for or requirements for a storm water collection system.

A potential gray water distribution system will require evaluation if the newly renovated building is to achieve any specific levels of water use efficiency.

New drainage and water supplies to all new washroom groups, suites, and mechanical rooms will be required for the building.

2.3.2.2 Fire Protection

A new automatic fire sprinkler system will be required to meet the requirements of NFPA-13 and any other specific code authorities. It is assumed a complete code study will be completed for the building in the detailed design phase to further define the specific requirements, hazard classifications, and water density requirements of the new system.

2.3.2.3 Refrigeration

The existing ammonia refrigeration plant will require a capacity upgrade to meet the demand of the newly expanded building. In addition to a capacity increase, a new control system, installation of ammonia heat recovery heat exchangers, piping, and related ancillary equipment will be required for the plant upgrade. Specific requirements will be determined in the detailed design phase.

2.3.2.4 HVAC Systems

The newly expanded building will be required to meet all applicable current codes for occupancy, in accordance with National Building Code, ASHRAE, and other applicable standards for this type of facility.

The mixed use nature of the facility will require a system that is flexible to meet the demands of many different modes of operation:

1. No occupancy – heating only
2. Minimum occupancy – heating and cooling
3. Medium occupancy – heating and cooling
4. Maximum occupancy – heating and cooling
5. Maximum occupancy – heating, cooling and high exhaust demand

Humidification control is absolutely required for the building, both to provide additional humidification, and de-humidification functions, depending on the season and demand from the event within the building.

2.3.2.5 Controls

The newly renovated building will require an upgraded control system capable of managing the demands of the building for various HVAC systems, refrigeration plant, and integrated lighting control. Modern buildings of this description and type also provide integration of security, and life safety systems into the total control system for the building.

Modern arena facilities also have the ability to match event programming schedules into the operational aspects of the building to provide environmental control and lighting control of the building based on the type and density of the occupancy anticipated.

Additional features for energy use tracking and reporting will also be required for the system to provide useful information to operators for efficient management of the building.

2.3.3 Upgraded Mechanical Systems Description

2.3.3.1 Plumbing

Mechanical systems requirements for the newly renovated building will consist of upgrades to the existing plumbing fixtures to meet current codes and standards for fixture quantities and water efficiency. This includes approximately 194 fixtures to be replaced and upgraded.

Options A and B vary in additional fixture quantities, however both will require the addition of a new storm water collection and disposal system, new domestic hot and cold water distribution and sanitary sewer collection system. Option C will have a smaller scope for storm water and be comprised of only new fixture replacements in existing locations.

Storm water collection from the new roof structure will be required complete with piping and connection to the existing storm water system at the building. The detailed design process will need to evaluate any need for or requirements for a storm water collection system. This option is not included in the costing below.

A potential gray water distribution system will require evaluation if the newly renovated building is to achieve any specific levels of water use efficiency. This option is not included in the costing below.

New drainage and water supplies to all new washroom groups, suites, and mechanical rooms will be required for the building.

2.3.3.2 Fire Protection

A new automatic fire sprinkler system will be required to meet the requirements of NFPA-13 and any other specific code authorities. It is assumed a complete code study will be completed for the building in the detailed design phase to further define the specific requirements, hazard classifications, and water density requirements of the new system.

Cost differences in the various options are due to varied scope of the size of the project an impact on existing infrastructure.

2.3.3.3 Refrigeration

The existing ammonia refrigeration plant will require a capacity upgrade to meet the demand of the newly expanded building. In addition to a capacity increase, a new control system, installation of ammonia heat recovery heat exchangers, piping, and related ancillary equipment will be required for the plant upgrade. Specific requirements will be determined in the detailed design phase.

2.3.3.4 HVAC Systems

The mechanical systems proposed for the building will utilize a combination of heat recovery from the ammonia refrigeration plant, electric energy for cooling and natural gas for heating. Heat recovery from the plant will be the primary source of energy for heating the building when the refrigeration system is in operation. A gas fired condensing boiler will provide heat energy when the plant source is not available.

The new heating loop piping system will also serve to provide cooling water to all individual heat pumps in the building, with a central fluid cooler rejecting heat energy from the building when it is not usable.

To utilize this concept, a system of water to air source unitary heat pump units will be used in all areas of the building to provide heating and cooling and air change to the space. This will require installation of approximately 55 additional small capacity heat pump units ranging in size from 1 to 15 tons complete with ductwork, piping, and controls.

In the main bowl area of the building, a system of 4 large capacity air handling units will be constructed to provide all of the functions of heating, cooling, fresh air, filtration, exhaust air, humidification, and dehumidification.

System capacities will be in the range of minimum total of 200 tons for the minimum seating capacity to a high of 400 tons for the maximum seating capacity scenario. In all cases the concept is identical, with only the exact equipment capacity varied. Ventilation and air change rates must be in compliance with the applicable ASHRAE Codes and will range from a total of 231,000 cfm to 144,000 cfm for the various options noted in the project. Fresh air and exhaust ranges from a total of 78,000 cfm to 57,000 cfm for the various options of the project. These air handling units will be variable capacity with integral heat pump units for heating and cooling energy supply with supplemental hot water coils for heating.

A system of piping will be required within the building to transfer energy from a central mechanical room to a distribution network connecting all of the major air handling units and various individual heat pump units throughout the building.
The total cooling capacity of the heat rejection system of heat pumps and fluid cooler for the building varies in peak capacity from 360 tons to 165 tons for the various options noted in the project.

Additional miscellaneous exhaust and fresh air systems will be required for new washroom spaces, vending areas and miscellaneous rooms as required for the newly renovated building.

2.3.3.5 Controls

The new building is will be equipped with a completely new fully automated DDC EMCS with integrated lighting controls, fire alarm and security functions.

2.3.4 DRAWINGS (Mechanical)

2.4 ELECTRICAL

2.4.1 Description

MCW Maricor has prepared this report, which summarizes the existing condition electrical systems, identifies issues and concerns and provides opinions of probable costs for upgrading these systems to meet the criteria proposed by the City of Moncton and to meet modern codes and standards with 3 options of seating capacity for upgrading of the existing coliseum building.

2.4.1.1 Power Distribution System

The existing building is equipped with a 12.47KV Unit Substation in the Main Electrical Room. This includes two separate 1000KVA, 12.47KV-600/347V transformers. The main switchgear distribution boards are aging 1600A Westinghouse units. One of the boards is original to the building's construction, while the other was installed in a 1986 renovation. Both boards are obsolete as breakers can no longer be sourced for this equipment. A 12.47KV switch feeding the Agrena is also located in this room.

The main electrical room includes several 600-208/120V 3 phase transformers of various sizes. Virtually all of this equipment is nearing or past it's useful life (30 years in accordance with RS Means Facilities Maintenance and Repair) and is due for replacement.

120/208V panelboards are spread throughout the building in various locations such as, exhibition area, kitchens, admin, Catwalk (for tradeshows) etc. Many of these panels are original to the building's construction and are past the end of their useful life. Four pin and sleeve connections are located in each corner or the ice surface for trade show 120/208V power connections.
The electrical room is in violation of Canadian Electrical Code 2009 (CEC) article 2-310 as there is not 1.5m between the main switches and the existing 500KVA transformer.

There are 3 locations for 208V, 3 phase connection of power for large concerts and events:

- One 400A disconnect switch in the Main Electrical Room.
- One 200A disconnect near boiler room
- Two 200A disconnects under section 22 (clearances in this area are in violation of CEC article 2-308)

Connection to these disconnects requires cables to be run over the floor. To use the 400A disconnect, the main electrical room door must be held open with cable passing through. This is a potentially unsafe arrangement.

Various wiring methods. Surface and recessed conduits are throughout the building. Teck cable, flexible metallic conduit and AC90 armoured cable are all in use. Wiring methods are not clean in many areas with wiring is inadequately supported. Open junction boxes, open knockouts and missing hardware were noted during site reviews.

Many wiring penetrations of walls are not sealed or fire-stopped. This is especially prevalent in the Main Electrical Room.

2.4.1.2 Lighting System

The ice surface lighting includes several 1000W metal halide luminaire which utilize motorized louvers to provide instant on and off functionality for events. These fixtures were added during a retrofit in approximately 2002. This retrofit included the addition of a Gentec low voltage light control system. There are also several 100W metal halide luminaires over the ice surface.

Lighting over the seating areas is by 250W metal halide highbay luminaires, with 100W metal halide luminaires around the perimeter walkway.

Lighting in dressing rooms and utility areas is generally T8 fluorescent. Fixtures original to the building's construction were recently retrofitted from T12 fluorescent to T8. Fixtures are typically in very poor condition and are due for replacement. Incandescent bulbs in porcelain lamp holders were noted in some areas.

Lighting in the Exhibition area is a combination of T8 fluorescent and metal halide lighting. Fixtures are in poor condition.

Lighting in concessions area is typically by T8 fluorescent parabolic luminaires. Lighting in admin areas is typically T8 fluorescent troffers. Fixtures in these areas are in fair condition.

The building was recently retrofitted with an emergency lighting inverter. This inverter provides emergency power to several fluorescent luminaires located throughout the building. The system is in good condition.

Exit signage throughout the building is typically LED EXIT and bilingual EXIT/SORTIE type. Several obsolete combination emergency lighting units are still in use.

2.4.1.3 Telephone and Data Systems

The utility demarcation point is located in the Main Telephone Room adjacent to the Exhibition Area. This room includes incoming Aliant copper and fibre, station protectors, BIX telephone distribution, Rogers coaxial cable entrance, cable splitters and a small data rack.

Data cabling is generally Category 5e and telephone cabling is a mixture of Cat 5 and Cat 3.

The room is undersized and does not meet BICSI or EIA/TIA recommendations. Grounding is not in accordance with BICSI recommendations. Cabling is generally sloppy and disorganized with no colour coding and inadequate support.

The existing data rack is too small for this facility.

2.4.1.4 Fire Alarm System

The fire alarm was replaced with a fully addressable Edwards EST2 system in 2009. The system consists of speakers, strobes, manual pull stations, smoke detectors and sprinkler supervisory devices. This system is relatively modern and expandable.

2.4.1.5 Security Systems

The building is equipped with a DSC Power Series PC1832 intrusion alarm system. This system includes door contacts, motion sensors, panic buttons and keypad arming/disarming. This system has limited expandability and is due for replacement.

2.4.1.6 Electric Heaters

There are several electric unit heaters in utility areas. These heaters are in poor condition and are in need of replacement.

2.4.1.7 Score Clock

The existing score clock was added in May 2006. Due to the relatively low height of the roof, a smaller model was chosen. The score clock is in fair condition.

2.4.1.8 Sound System

The existing sound system for the arena has been upgraded numerous times in recent years. This review did not include sound quality testing, but the sound quality for this system is not comparable with a modern, properly engineered system. The acoustics of the building have a major impact on the audibility of the sound system.

2.4.2 Requirements For Upgraded Electrical Systems

The following sections provide a summary of the electrical system requirements for the renovated facility.

2.4.2.1 Power Distribution System

The newly renovated power distribution system is required to meet current editions of the CAN/CSA C22.1-09 Canadian Electrical Code Part 1 (CEC), the National Building Code of Canada (NBCC) and NB Power Service Entrance standards.

The power distribution system will be required to meet the demand of additional mechanical loads in the building including ventilation and humidification.

The power distribution system should be sized to provide adequate capacity for future growth.

2.4.2.2 Lighting System

The renovated lighting system shall meet the requirements of NBCC and shall be designed in accordance with the Illuminating Engineering Society of North America (IESNA) recommendations.

Ice surface lighting shall be designed to “Class 1” light levels as defined by IESNA. This requires an average of 150 footcandles on the ice surface. This is the recommended level for Professional Ice Hockey and Figure Skating events.

2.4.2.3 Telephone and Data Systems

The telephone and data systems shall meet BICSI and ANSI/TIA/EIA-568-B standards. Telephone entrance and demarcation point shall be in accordance with Aliant standards.

2.4.2.4 Fire Alarm System

The fire alarm system shall meet the requirements of NBCC and CAN/ULC-S524 Installation of Fire Alarm Systems.
The existing system must be expanded with devices added as required for new areas. New exits must be equipped with manual pull stations. Upgraded sprinkler system must be supervised. Audibility of alarm signals must be maintained in all areas of the building.

2.4.2.5 Security Systems

The intrusion alarm system shall protect the building from break in via door contacts and passive infrared motion detection in circulation areas. The system shall be remote monitored.

The security system shall include video surveillance equipment in areas where cash is handled and areas at risk of vandalism, both interior and exterior.

An access control system is currently being installed within the facility. An access control system shall limit access to certain areas of the building: Admin offices, maintenance areas, VIP areas, etc.

2.4.2.6 Electric Heaters

Electric heaters may be included to respond heat losses in some areas. If used, electric heat control shall be integrated with the building EMCS.

2.4.2.7 Sound System

If the roof is raised, a new sound system is required to address the changes in geometry of the arena space. Separate speakers are required for VIP boxes and other perimeter areas (washrooms, concessions, etc) for good audibility throughout the building.

2.4.3 Upgraded Electrical Systems Descriptions

2.4.3.1 Power Distribution System

The existing 12.47KV Unit Substation is past its useful life and will be removed. A new 600V, 3-phase padmount transformer will be installed at the building exterior adjacent to the electrical room. A new 3000A, 600V, 3-phase service will be provided to the building. A separate new 2000A, 600V, 3-phase service will be required for the Agrena. Its 12.47KV substation would also be removed and replaced with an exterior utility padmount transformer Service entrance cables for the Coliseum will utilize a ventilated cable bus system to maintain free air rating. Eliminating the unit substations will significantly reduce maintenance costs for the 1000KVA transformers and high voltage switches.

All distribution equipment in the building will be replaced with new including transformers, panelboards, wiring, disconnect switches etc.
Code required work space clearances will be maintained for all electrical equipment. Elimination of the unit substation will reduce space requirements for electrical equipment.

Sub electrical rooms are needed at various locations throughout the building. It is proposed to locate four sub electrical rooms in the four corners of the building at truss space adjacent to mechanical equipment. These electrical rooms could also be used for communications services for the VIP boxes.

A trenched wireway should be provided for concert/event electrical connections to eliminate the practice of running cables across the floor at various locations when these connections are made. This requires cutting of the floor slab adjacent to the ice surface to create a wireway to the main electrical room.
Refer to attached Power Distribution Single Line Diagram for a proposed concept for the power distribution system.

2.4.3.2 Lighting System

Existing 1000W metal halide motorized louver luminaires are in fair condition and suitable for reuse. Newer LED highbay technologies do not yet provide the required lumen output for this high ceiling, high lighting level application.

Existing ice surface lighting levels were measured and determined to range from 60 – 140 footcandles with an average of approximately 90 foot candles. As many as twenty luminaires were not functioning when measurements were taken due to burnouts. In accordance with IESNA recommendations, these lighting levels should be increased to an average of 150 footcandles as required for “Class 1” Professional Ice Hockey and Figure Skating events. This, along with the proposed increase in roof heights for Options A and B described herein, requires the addition of approximately 40 more 1000W metal halide motorized louver luminaires.

The existing Gentec low voltage lighting controller could potentially be reused and expanded to accommodate additional ice surface lighting.

Existing 100W and 250W metal halide luminaires above seating and perimeter walkway areas will be replaced with LED highbay luminaires. This provides far greater lamp life (potentially 50,000+ hours), “instant ON” (no warm up required) and superior controllability. Additional seating areas will also utilize LED highbay luminaires.

In the near future, there may be LED luminaires suitable for replacing the exsiting1000W metal halide luminaires. This should be evaluated during in more detail during the design phase.

Lighting in dressing rooms, washrooms, administrative and utility areas shall utilize T8 fluorescent luminaires controlled by occupancy sensors integrated with low voltage control system.

Lighting for Exhibition space shall utilize T8 fluorescent luminaires with multiple lighting levels switching capability (“Tri-level”) integrated with low voltage control system.

Lighting for Concession areas shall utilize T8 fluorescent luminaires controlled by standard switching integrated with low voltage control system.

Lighting for VIP boxes shall utilize decorative LED luminaires complete with dimming control integrated with low voltage control system.
Exterior parking lot poles and wall mounted luminaires shall be retrofitted with LED exterior luminaires. Additional poles shall be added to increase lighting levels to IESNA recommended levels. Control shall be integrated with low voltage control system.

An intelligent low voltage lighting control system shall be provided for all lighting. This allows for programming of lighting controls including time controls and photocell controls. This also enables programming of preset scenes, all lights on for emergency, all lights off for closing, etc. The existing Gentec low voltage lighting control system could potentially be expanded for this application. This should be evaluated in further detail during the design phase

Refer to attached electrical sketches for proposed lighting types and approximate quantities by zone.

2.4.3.3 Telephone and Data Systems

The existing telephone room is undersized for this building. A new room, approximately 10’x11’ is needed. The existing telephone and fibre entrances should be replaced with new. New telephone station protectors and utility and owner’s distribution blocks shall be provided. New copper and fibre demarcation points shall be provided. A new floor standing data rack shall be provided complete with high density category 6 patch panels and fibre patch panel.

All new cabling shall be provided. Cabling shall be Category 6 augmented to meet future needs. Cable shall be FT- 6 plenum rated. Cabling shall be installed and supported in accordance with BICSI and ANSI/TIA/EIA-568-B standards.

Four additional telecommunications rooms, shared with electrical rooms) shall be provided in the four corners of the building in truss space. Fibre risers shall be provided from the fibre entrance demarcation point to new floor standing racks in each of these rooms. Each rack shall be complete with high density category 6 patch panels and fibre patch panel.

Telephone cabling shall be provided to telephone outlets and designated locations. It is recommended that category 6 augmented cable be used so that a VoIP solution could be utilized at a later time if desired.

A wire basket shall be provided throughout facility main circulation areas to provide a convenient path for routing of communications cables.

2.4.3.4 Fire Alarm System

The existing Edwards EST2 will remain in the main entrance area. It will be expanded with devices added as required for new areas. New exits will be equipped with manual pull stations. Upgraded sprinkler system will be supervised. Speakers and strobes to match existing will be added to increase audibility in new areas. The complete system will be tested and certified by a third party testing company.

2.4.3.5 Security Systems

The existing intrusion alarm panel will be replaced with a new addressable intrusion alarm panel that is capable of accepting wireless devices. All exterior doors shall be protected with door contacts. Passive infrared motion sensors will be provided in general circulation areas. Glass break sensors will be added in areas with high amounts of glazing such as the main entrance lobby. Arming/Disarming keypads will be located at designated entrances.

A IP/POE video surveillance system shall be added including a network video recorder, POE switch, designated widescreen monitors, monitoring software and minimum 32 cameras at critical interior and exterior locations.

The access control system shall include intelligent, networked, programmable panels. Proximity card readers shall be installed at secured doors and wired to electric strikes. A designated workstation complete with access control software shall be provided for monitoring and logging of system. The access control system shall be interfaced with the intrusion alarm system to alarm unauthorized access conditions.

2.4.3.6 Electric Heaters

Electric heaters may be provided in some areas to supplement mechanical heating systems. If needed, new baseboards convectors and unit heaters will be heavy duty commercial style, controlled by EMCS.

2.4.3.7 Score Clock

The existing score clock is in fair condition and could potentially be removed, stored and reinstalled on the higher roof. When this score clock was purchased, larger more sophisticated score clocks were not optional due to the ceiling height limitation. The Owner may wish to review alternatives if the roof height is to be increased.

2.4.3.8 Sound System

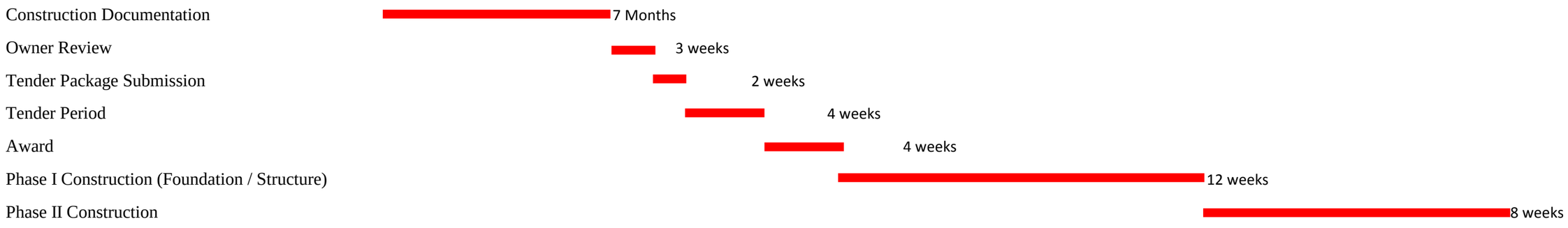
If the roof is raised, a new sound system is required to address the changes in geometry of the arena space. Separate speakers are required for VIP boxes and other perimeter areas (washrooms, concessions, etc) for good audibility throughout the building.

2.4.4 DRAWINGS (Electrical)

3.0 PROJECT SCHEDULE AND PHASING

Full Schedule (Bar Chart)

Project Schedule and Phasing (Option A)



4.0 OPINION OF PROBABLE COST

4.1 OPTION "A"

9000 Seat Expansion / Renovation

Total Construction Cost ***$40,215,575 +HST***

Refer to enclosed breakdown.

4.2 OPTION "B"

7500 Seat Expansion / Renovation

Based on breakdown completed for Option "A", the Total Cost for Option "B" would be as follows:

Total Construction Cost ***$38,137,248 +HST***

4.3 OPTION "C"

Existing Seating to remain status quo

Total Construction Cost ***$27,258,691 +HST***

OPINION OF PROBABLE CONSTRUCTION COST

PROJECT: Moncton Coliseum (Option "A")
LOCATION: Moncton, NB
CLIENT: City of Moncton
DATE: March 25, 2013
CONSULTANT: Architecture 2000 Inc.

ESTIMATE : Class 'B' Estimate
PROJECT NO: 3210
PREPARED BY: Ian MacLaughlan
GROSS FLOOR AREA:

ELEMENT		Elemental Cost Quantity		Unit Rate	Elemental Amount Sub-total	Total	Rate per m2 Sub-total	Total	%
10	**SUBSTRUCTURE**					**2,500,000**			6.2%
11	Foundation and concrete structure *(Option A) (includes formwork, concrete supply, placement, concrete finish and reinforcing steel)*				2,500,000				
20	**STRUCTURE**					**10,000,000**			24.9%
21	Steel Structure *(Includes supply and erection of structural steel, open web steel joists and metal roof deck)*				10,000,000				
30	**EXTERIOR ENCLOSURE**					**3,637,913**			9.0%
31	Roofing & Blocking	101233	s.ft.	12.50	1,265,413				
32	Exterior Wall System								
	Metal Siding	77500	sft	25.00	1,937,500				
33	Exterior Steel Stairs		LS		150,000				
	Steel Railings		LS		15,000				
34	Alterations at existing Building and Protection		LS		250,000				
36	New Aluminum Entrances		LS		20,000				
40	**INTERIOR PARTITIONS AND DOORS**					**0**			0.0%
41	Partitions **(See Item 51)**				**0**				
42	Interior Doors and Frames **(See Item 52)**				**0**				
50	**INTERIOR FINISHES**					**2,232,065**			5.6%
51	Painting, Partitions, Millwork, Washroom Access.		LS		120,000				
52	Door, Frames and Hardware		LS		100,000				
53	Precast Concrete Bleachers		LS		1,388,520				
54	Seating		LS		513,545				
55	Cutting and Patching for M. & E.		LS		100,000				
56	Press Box Glazing		LS		10,000				
60	**FITTINGS AND EQUIPMENT**					**200,000**			0.5%
61	Elevators, including concrete block enclosure	2	unit	100000	200,000				
70	**MECHANICAL AND ELECTRICAL**					**9,799,000**			24.4%
	Mechanical				**5,925,000**				
71	Plumbing System		LS		1,087,000				
72	Fire Protection System		LS		793,000				

OPINION OF PROBABLE CONSTRUCTION COST

PROJECT: Moncton Coliseum (Option "A")
LOCATION: Moncton, NB
CLIENT: City of Moncton
DATE: March 25, 2013
CONSULTANT: Architecture 2000 Inc.

ESTIMATE : Class 'B' Estimate
PROJECT NO: 3210
PREPARED BY: Ian MacLaughlan
GROSS FLOOR AREA:

ELEMENT		Elemental Cost Quantity		Unit Rate	Elemental Amount Sub-total	Total	Rate per m2 Sub-total	Total	%
73	Refrigeration Plan		LS		175,000				
74	HVAC Systems		LS		3,300,000				
75	Controls		LS		570,000				
76	**Electrical**				**3,874,000**				
	Site Services		LS		267,000				
	Power and Distribution		LS		1,150,000				
	Lighting		LS		1,005,000				
	Data / Tel System		LS		320,000				
	Fire Alarm		LS		17,000				
	Security Systems		LS		290,000				
	Sound System		LS		575,000				
	Electrical Removals and Reinstallation		LS		250,000				
NET BUILDINGS SUBTOTAL - LESS SITE						**28,368,978**			70.5%
80	**SITE & ANCILLARY WORK**					**900,000**			2.2%
81	**Sitework**				**300,000**				
	Sitework, Landscaping, Paving		LS		300,000				
82	**Demolition**				**500,000**				
	Demolition of existing structure		LS		500,000				
83	Lower Bowl Seating removal and reinstallation		LS		**100,000**				
NET BUILDINGS SUBTOTAL - INCLUDING SITE						**29,268,978**			72.8%
90	**OVERHEAD AND PROFIT**					**4,244,002**			10.6%
91	Contractor's Overhead and Profit	7	%		2,048,828				
92	Contractor's General Conditions	8	%		2,195,173				
ESTIMATED TENDER AMOUNT						**33,512,979**			83.3%
100	**ALLOWANCES**					**6,702,596**			
100	Design Contingency	10	%		3,351,298				
101	Construction Contingency	10	%		3,351,298				
TOTAL CONSTRUCTION COST						**$40,215,575**			100.0%

Opinion of probable cost of $ 40,215,575 is in current year values without HST.
Approximate value of professional fees are based on AANB Fee Schedule for Option A = $2,570,000 + HST